

Listing of Claims

In the Claims:

Please cancel claims 7-9, without prejudice.

1. (Original) A magnetic head, comprising:

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a magneto-resistive film having a ferromagnetic free layer at a top part thereof, said ferromagnetic free layer changing a magnetization thereof in response to an external magnetic field;

first and second magnetic domain control patterns provided on said ferromagnetic free layer, each of said first and second magnetic domain control patterns causing a pinning of magnetization in said ferromagnetic free layer in the vicinity thereof;

a first electrode provided on said ferromagnetic free layer in contact therewith at a region located between said first and second magnetic domain control patterns; and

a second electrode provided in electrical contact with a bottom surface of said magneto-resistive film.

2. (Original) A magnetic head as claimed in claim 1, further comprising a first insulating film covering said first magnetic domain control pattern and a second insulating film covering said second magnetic domain control pattern, such that said first insulating film is interposed between said first magnetic domain control pattern and said first electrode and such that said second insulating film is interposed between said second magnetic domain control pattern and said first electrode.

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3. (Original) A magnetic head as claimed in claim 2, wherein said first and second insulating films have a generally identical thickness.

4. (Original) A magnetic head, comprising:

a magneto-resistive film;

a pair of magnetic domain control patterns provided at both lateral sides of said magneto-resistive film, each of said magnetic domain control patterns causing a pinning of magnetization in said magneto-resistive film in the vicinity thereof;

a pair of electrodes provided respectively on said pair of magnetic domain control regions with a mutual separation from each other, each electrode having a tip-end part extending over said magneto-resistive film toward the other electrode,

wherein each tip-end part extends beyond said domain control region, on which said electrode having said tip-end part is provided, with a protruding distance of 0.25 μm or less.

5. (Original) A magnetic disk apparatus, comprising:

a rotary magnetic disk; and

a magnetic head scanning over a surface of said magnetic disk,

said magnetic head comprising:

a magneto-resistive film having a ferromagnetic free layer at a top part thereof,

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or
said ferromagnetic free layer changing a magnetization thereof in response to an external magnetic field;

first and second magnetic domain control patterns provided on said ferromagnetic free layer, each of said first and second magnetic domain control patterns causing a pinning of magnetization in said ferromagnetic free layer in the vicinity thereof;

a first electrode provided on said ferromagnetic free layer in contact therewith at a region located between said first and second magnetic domain control patterns; and

a second electrode provided in electrical contact with a bottom surface of said magneto-resistive film.

6. (Original) A magnetic disk apparatus, comprising:

a rotary magnetic disk; and

a magnetic head scanning over a surface of said magnetic disk,

said magnetic head comprising:

a magneto-resistive film;

a pair of magnetic domain control patterns provided at both lateral sides of said magneto-resistive film, each of said magnetic domain control patterns causing a pinning of magnetization in said magneto-resistive film in the vicinity thereof;

a pair of electrodes provided respectively on said pair of magnetic domain control regions with a mutual separation from each other, each electrode having a tip-end part extending over said magneto-resistive film toward the other electrode,

wherein each tip-end part extends beyond said domain control region, on which said electrode having said tip-end part is provided, with a protruding distance of 0.25 μm or less.

7-9. Canceled.

Respectfully submitted,

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